

METHOD FOR IMAGE CHARACTERIZATION USING COLOR AND  
TEXTURE STATISTICS WITH EMBEDDED SPATIAL INFORMATION

*See 9/14/05*  
This application is a continuation of 09/264,248, now US patent 6,542,642 which claims benefit of provisional application 60/118,212, filed on February 1, 1999.

BACKGROUND OF THE INVENTION

5 The present invention relates to a method for characterizing an image based on the color or textural content of the image.

Image characterization is a process for describing an image based upon the outcomes of the application of preselected measures to the image. Image characterization is useful in a number of applications such  
10 as digital image libraries where image content is useful as a basis for image indexing and retrieval. For image characterization to be practical and effective the outcome of the application of the measures to the image should be: (1) sufficient to distinguish between different images, (2) invariant to certain types of transformations of the image, (3) insensitive to  
15 noise, (4) easy to compute and (5) compact. Various methods of image characterization have been used and proposed with resulting image descriptors exhibiting these attributes to differing degrees.

A paper by Swain et al. entitled COLOR INDEXING describes the use of color histograms to characterize images. A color histogram of an  
20 image is obtained by calculating the frequency distribution of picture elements or pixels as a function of pixel color. Color histograms are invariant to translation or rotation of the image about the viewing axis. Color histograms can differ markedly for images with differing features. However, all spatial information about the features in the image is  
25 discarded in the creation of the color histogram. Therefore as long as two images have the same number of picture elements of each color it is not possible to distinguish between them using color histograms. This is true even if the two images contain features of completely different size or shape. For example, the total areas of the like colored (like hatched)  
30 geometric features of the two images of FIG. 1A and FIG. 1B are equal and require the same number of picture elements. The images cannot be distinguished on the basis of their color histograms even though